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ABSTRACT

The facilitative effects of inserted questions on a complex reading passage and a syntactically controlled reading passage were examined with 40 hearing impaired secondary students, half of whom were controls. Analysis of Ss' comprehension on criterion posttests indicated that there is little or no effect of syntax complexity alone, inserted questions alone, or of the interaction between syntax complexity and inserted questions on the level of reading comprehension. Findings, although not significant, did suggest that inserted questions may serve to maintain attention when students presumably can better read and understand the passage. (CI)

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EFFECTS OF INSERTED POSTQUESTIONS ON THE READING COMPREHENSION
OF HEARING IMPAIRED STUDENTS

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Effects of Inserted Postquestions on the Reading Comprehension
of Hearing Impaired Students

Jacqueline Maeder

For some children, learning language and understanding language are difficult if not almost impossible tasks. Hearing impaired children suffer in the learning of language because the syntax of their language is different from the syntax of Standard English. Some researchers (Russell, Quigley, and Power, 1976; Dale, 1976) have found that modifying sentence structures for deaf students in relation to the students' knowledge of syntax has a positive effect on sentence comprehension. However, there is some evidence to suggest that these positive effects diminish when students must comprehend connected discourse (Getson, 1979; Gadzuk, 1979).

Other researchers (Rothkopf, 1968; Anderson, 1970; Frase, 1962; Anderson and Biddle, 1976) have found that attentional processes are of central concern in the comprehension of connected discourse. These researchers use the mechanism of inserted questions for focusing learners' attention in prose learning. In their review of the research, Anderson and Biddle (1976) draw the following conclusions:

- 1) inserted questions have a facilitative effect on the retention and comprehension of prose materials,
- 2) questions placed after the passage to which they relate are more facilitative than questions placed before the passage to which they relate,
- 3) questions should be inserted as close as possible to the information to which they relate and should require short answer responses, and
- 4) students should respond overtly to inserted questions.

These earlier studies indicate facilitative effects of inserted questions when tested with competent readers. Only limited, inconclusive evidence is available regarding the effectiveness of inserted questions with "poor" readers (Richards and Hatcher, 1976; Maeder, 1978). Results of these studies indicate positive effects on the recall and comprehension of poor readers who responded to inserted questions. Other indirect evidence supports the effectiveness of inserted questions with poor readers (Ausubel and Fitzgerald, 1962; Sandus, 1973; Shavelson, Kavitch and Loeding, 1974).

The purpose of this study was to analyze the facilitative effects of inserted questions with hearing impaired students. These students typically do not read or comprehend what they read as well as their hearing peers. The facilitative effects of the inserted questions would be analyzed in (1) a complex reading passage and (2) a syntactically controlled reading passage. The null hypotheses for the investigation were:

- 1) There will be no difference in performance on a reading comprehension test between students exposed to inserted postquestions and students receiving no inserted questions.
- 2) There will be no difference in performance on a reading comprehension test between students receiving the syntactically controlled reading passage and students receiving the complex reading passage.
- 3) There will be no interaction between students receiving both independent variables and their performance on the reading comprehension test.

Method

The effects of the inserted questions and syntax complexity were analyzed using two experimental treatments. Students responded overtly to written questions inserted into (1) a complex reading passage or (2) a syntactically controlled reading passage. An additional 20 students acting as two control groups received no questions while reading each of the two passages.

Materials

Two reading passages were developed. The passages were identical in content presented. One passage, termed the complex reading passage, did not control for syntax. This passage included some simple active declarative sentences but was mainly composed of sentences with relative clauses, gerunds, infinitives, complements, and passives. The complex reading passage was 720 words in length. The other passage was 550 words in length. This shorter passage was syntactically controlled and consisted almost exclusively of simple active declarative sentences.

Inserted postquestions and criterion test items were developed for the reading passages. The postquestions and test items were identical across both reading passages and were developed following item generation rules taken from Bormuth (1970) and Anderson (1972). The item pool contained 12 comprehension items (Anderson, 1972). All items required a constructed response.

Six items were inserted into the passages on an average of one every 1.5 paragraphs. Items were inserted after the material to which they related and at logical and identical places across both passages. Inserted items were on a page separate from the text. Students were directed to respond overtly to each question. Answers to the inserted questions were not provided.

Data Source

Forty students from the Model Secondary School for the Deaf participated in the study. Reading scores on the Stanford Achievement Test, Hearing Impaired Versions, Levels 1 through 6, Form A were available for 34 of the students. These scores ranged from a 2.2 to a 7.1 grade equivalent, with an average grade equivalent of 4.2. All 40 students were randomly assigned to a treatment or a control group.

Design

The investigation was conducted in regularly scheduled classes. Each student was given as much time as needed to read the passage and to respond to the inserted questions. No additional help was given. Upon completion of the reading, each student was given the criterion test. Again each student was given as much time as needed to complete the criterion test. Test items were scored dichotomously (1 = pass, 0 = fail). No partial credit was given. The design of the experiment is given in Figure 1.

Dependent Measures

Item Development

The criterion posttest consisted of six comprehension items. All items required a constructed response. None of the criterion test items were repeated items.

Guidelines for the development of these items were taken from the research and theory of achievement testing by Bornath (1970) and from Anderson (1972). The items were developed to define operationally the domain of interest related to the reading passage. Each item was constructed using specific item generation rules. The rules explicate the item writing process and allow for the production of items with logical relevance to the instructional materials.

The items were designed to measure students' comprehension of the information presented in each reading passage. The meaning of comprehension is taken from Anderson (1972). He suggests that the crucial characteristic of a test item purporting to measure comprehension is the relationship of the wording of the item to the wording of the instruction. Comprehension must be inferred from the student's ability to answer questions which are not drawn verbatim from the instruction but are paraphrases of text statements.

		Read Passage	Immediate Posttest
Administer Stanford Achievement Test, Hearing Impaired Version, Levels 1-6, Form A	Treatment 1 Simple syntax; Inserted postquestions	Respond to inserted postquestions	Complete test
	Treatment 2 Complex syntax; Inserted postquestions	Respond to inserted postquestions	Complete test
	Control 1 Simple syntax	No inserted postquestions	Complete test
	Control 2 Complex syntax	No inserted postquestions	Complete test

Figure 1: Design of the Experiment

Anderson (1972) defined a complete paraphrase as a restatement of the original sentence which (1) has no substantive words (nouns, verbs, modifiers) in common and (2) is equivalent in meaning to the original or base sentence. In this investigation, only partial paraphrases were used. A partial paraphrase is a restatement of the original sentence with one or more synonymous words replacing one or more words in the original sentence. All substantive words are not necessarily replaced. In all comprehension items used here, the paraphrase was inserted into the item stem and was not expected to occur in the students' responses.

The following item generation rules for comprehension items were used:

- 1) specify the information to be tested,
- 2) isolate substantive words or phrases,
- 3) substitute a synonym or synonymous phrase for one of the substantive words,
- 4) transform the new or paraphrased items into constructed response questions by inserting the appropriate question word (i.e., who, what, with, when, why, etc.) into the paraphrased items.

Scoring keys were developed and reviewed for accuracy of answers and acceptable boundaries for answers to be supplied by the student.

Results

All results obtained in the investigation are discussed under the heading Criterion Test Performance. Tables 1 and 2 summarize the findings.

Criterion Test Performance

Group performance for each treatment group and for each control group was estimated from the criterion measure administered immediately upon completion of the reading. The mean scores are given in Table 1. Results

TABLE 1
Mean Scores and Standard Deviations for All
Groups for Criterion Test Performance

Criterion Test Performance (<u>X</u> = 6)	
Treatment 1 Simple Syntax and Inserted Questions (<u>n</u> = 10)	$\overline{M} = 3.1$ $\overline{SD} = 1.79$
Treatment 2 Complex Syntax and Inserted Questions (<u>n</u> = 10)	$\overline{M} = 2.6$ $\overline{SD} = 1.58$
Control 1 Simple Syntax (<u>n</u> = 10)	$\overline{M} = 2.6$ $\overline{SD} = 1.71$
Control 2 Complex Syntax (<u>n</u> = 10)	$\overline{M} = 2.5$ $\overline{SD} = 1.65$

for all groups are interpreted similarly. For example, mean test score (M) on the six-item criterion posttest is 3.1 for Treatment 1, the Inserted Question, Simple Syntax group. The standard deviation is 1.79. Table 2 summarizes the analysis of variance test for significant differences among means. There were no significant differences among the groups on the posttest scores. Conclusions from this analysis of variance make it reasonably safe to make the following assertions:

- 1) There is apparently little or no effect of syntax complexity alone on level of reading comprehension.
- 2) There is apparently little or no effect of inserted questions alone on level of reading comprehension.
- 3) There is apparently little or no interaction between syntax complexity and inserted questions on the level of reading comprehension.

Discussion

The results of the investigation show no significant effects of inserted postquestions in either a simple or a complex syntactical passage with this particular group of students. However, students receiving inserted questions in the simple passage performed a little better (M = 3.1) than the three other student groups. Mean posttest scores for the other groups show almost no variation. The results show no educationally significant effects, yet, suggest that inserted questions may serve to maintain attention when students presumably can better read and understand the passage.

Unfortunately the study has several limitations. A longer treatment, offering two or more equivalent replications, and an increase in sample size may affect the results. Additionally, a larger number of criterion posttest items to more accurately measure mean differences and variance among groups should be developed. Finally, the effectiveness of inserted questions with several reading passages should be analyzed in conjunction with student

TABLE 2
Analysis of Variance for the Criterion Test Performance

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Inserted Questions	.9	1	.9	.38
Complexity	.9	1	.9	.38
Inserted Questions x Complexity	.4	1	.4	.17
Within	<u>86.2</u>	<u>36</u>	2.39	
Total	88.4	39		

reading skills. The effectiveness of the inserted question mechanism may vary with the reading comprehension level of the students and/or with other skills associated with reading competence. Variables such as length of instruction, question type, syntax complexity, and student ability levels most probably interact in learning from prose materials. The parameters of these variables that would ensure effective, efficient instruction are, as yet, inadequately delineated.

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